CHAMPION-INTERNATIONAL PAPER COMPANY
(Russell Paper Company)
West bank of the Spicket River at Canal Street
Lawrence
Essex County
Massachusetts

HAER No. MA-139

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
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HISTORIC AMERICAN ENGINEERING RECORD

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(Russell Paper Company)

Location: West bank of the Spicket River at Canal Street, Lawrence, Essex County, Massachusetts
UTM Coordinates: A–19.323910.4730480; B–19.324010.4730425; C–19.324025.4730310; D–19.323800.4730275
USGS Quadrangle: Lawrence, Massachusetts

Date(s) of Construction: c.1870-1944

Designer(s)/ Builder(s): Salmon W. Wilder (Wilder Mill)
Champion-International Paper Company (Paper Machine Building and Clay Storage Silos)

Present Owner: City of Lawrence, Massachusetts.

Present Use: Vacant and scheduled for demolition, 1997.

Significance: Although much of the paper mill complex is no longer extant, the surviving structures represent the chronology of several important New England paper manufacturing companies, from the pioneering efforts of William A. Russell, through a period of major expansion under the renowned Champion-International Company and its association with the National Geographic Magazine, to the mill's decline as the manufacturing of paper gravitated toward the forests of northern New England. The site is also a significant component of the North Canal Historic District, a mile-long complex of mill structures which were instrumental in the development of the City of Lawrence during the mid-nineteenth and early twentieth centuries.

Project Information: This documentation was initiated as a mitigation measure prior to the federally funded relocation of Canal Street and demolition of the remains of the paper mill complex by the Massachusetts Highway Department. This documentation was prepared between February and October 1997 by:

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Site Description

The surviving buildings of the Champion-International Paper Company and its predecessors in Lawrence, Massachusetts are located on a 3.16 acre site bounded by Canal Street on the south, the Spicket River on the east, the recently demolished Everett Cotton Mills complex on the west, and Lawrence General Hospital parking lots on the north. Two 2-story brick mill structures, with various additions and alterations, and a cluster of four clay-storage silos are all that remain[1] of a once-thriving paper mill complex that evolved over a period of 125 years, under five companies, eventually occupying a 9.5 acre site bounded by Canal, Prospect and Garden streets. The earlier of the two mills, known historically as the Wilder Mill and designated Mill No. 2 by the Champion-International Paper Company, is a composite of several attached brick buildings which range in date from 1873 to 1928. The second mill, the Paper Machine Building or Mill No. 3, was constructed in 1928 by Champion-International, replacing several earlier buildings. Running north-south between the two mills is the right-of-way for a spur railroad track on the former location of Spicket Street.

The 3.16 acre site, now owned by the City of Lawrence, is bisected by a mid-nineteenth century, open, stone-lined raceway which provided water for both power and paper manufacturing processes. The surviving paper mill buildings, burned and partially collapsed, and the silo cluster stand to the south of the raceway. The northern half of the site, once occupied by mill buildings, was filled to present grade during the mid-1980s following the demolition of a major portion of the fire-damaged former paper mill complex.[2]

The surviving paper mill buildings have sustained significant fire damage and all process machinery has been removed from the interiors. Portions of the buildings have already collapsed and the remainder are dangerously unstable. Because of the extensive structural damage, and the presence of hazardous materials in and around the buildings, and dangerous sinkholes in the ground adjacent to the buildings, the City of Lawrence has fenced the southern half of the former mill site to prevent access to the buildings. In addition, although an extensive search was conducted, no company records or building plans were found. Therefore, information on the existing buildings was, of necessity, compiled from on-site observation largely from points outside the security fence and from secondary sources, including a detailed site plan prepared in 1967, five years before the paper mill complex ceased operation.[3]

The paper mill complex is located at the extreme eastern end of Lawrence's North Canal Historic District which was listed in the National Register of Historic Places in 1984. Although listed in the National Register nomination form as "*ruins*," the remaining paper mill structures are considered contributing elements within the historic district.

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[1] A small concrete-block and brick structure stands on the east side of the Spicket River. Built in 1962 as an addition to the coating mill, it is not considered an historically significant component of the paper mill site.

[2] GenCorp, Inc., "Existing Site Plan," 1994.

[3] R.F. Flynn, "[Plan of] Oxford Paper Company, Lawrence, Mass., July 25, 1967" (Norwood, Mass.: Factory Mutual Engineering Division, 1967).

Standing Structures

The **Wilder Mill** (HAER No. MA-139-A), is bounded by Canal Street on the south, the spur railroad track on the west, the tailrace on the north, and a small open area, formerly the location of a transformer and a water tower, on the east. It is composed of four attached brick structures which, after 1902, were designated Building Nos. 2, 4, 5, and 6, respectively, by the Champion-International Paper Company.

The Wilder Mill was originally composed of two 2-1/2 story brick buildings constructed in 1873 by Salmon W. Wilder, proprietor of the Merrimac Paper Mills,[4] and set perpendicular to one another. The building to the south had a pitched roof with its gable end on Canal Street, while the building on the north had a gambrel roof. Architecturally, the small scale of the two buildings and their narrow windows with granite sills and lintels provide evidence of their relatively early date within the paper mill complex. The Wilder Mill also characterizes the small-scale nature of paper manufacturing processes, both in America and Europe, during the mid-nineteenth century. By 1888, William A. Russell had purchased the Wilder Mill as part of the Russell Paper Company's expansion.

The two original Wilder Mill buildings were designated Building No. 2 (on the south) and Building No. 6 (on the north) shortly after the Champion-International Paper Company was formed in 1902. The changing uses to which these two buildings were put by the various paper companies that owned them are indicated on historic maps and in historic photographs. In 1888 and 1895, for instance, Sanborn maps show that the Russell Paper Company stored wood pulp in the basement of Building No. 2 while paper was finished on the first floor and stored on the second. The attic was used for general storage. On maps and atlases for 1906, 1911 and 1926, respectively, Building No. 2 is designated the "*Paper Machine Building*" under the ownership of the Champion-International Paper Company. Maps and atlases show that Building No. 6 was consistently used as the "*Beater Engine House*" by each paper company until at least 1926. Later, after part of the building had been demolished and reconstructed to house a water wheel in 1928, the remainder was used for storage.

In 1887, a brick addition was constructed on the eastern end of Building No. 6. It has segmentally arched windows and an elaborate corbelled brick cornice beneath a shallow-pitched, almost flat, roof. Labeled "*Not Finished*" on the 1888 Sanborn Map, by 1895 it housed the rotary bleacher and storage for the bleaching "liquor." Maps and atlases for 1906 and 1911, respectively, show that the addition was designated Building No. 5 by the Champion-International Company c.1902; however, on later maps it was generally identified as part of Building No. 6.

The original second story and attic of Building No. 2 were removed sometime after 1918 except for a one-bay deep segment of the second story which remains at the southern (Canal Street) end of the building. This second story segment is capped by a flat roof with a corbelled brick cornice. The remainder of Building No. 2 had a shallow gambrel roof with continuous skylights along both flanks. Removal of the attic and second story were presumably necessitated by a change in the type and scale of the machinery in use below.

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[4] S.W. Wilder was listed at "foot of Canal" in 1866 Lawrence Directory. In later directories Wilder was listed as proprietor of Merrimack Paper Company, indicated on D.G. Beers's 1872 Map of Lawrence.

In 1928, the northwest corner of Building No. 6 was demolished and replaced with a three-story, steel-reinforced, brick structure with large industrial windows and a flat roof. Only the existing 3-bay, gambrel-roofed eastern segment of the original Building No. 6 was left standing. The replacement structure housed a new water wheel to power the huge paper machines in the adjacent Mill No. 3, also constructed in 1928.

Building No. 4, a small, two-story brick structure, approximately 1600 square feet in area, is attached at the southeast corner formed by the junction of Building Nos. 2 and 6. It was constructed in 1928 by the Champion-International Paper Company to house a large electrical turbine, now gone. Building No. 4 replaced an earlier engine house, which appears on the 1895 Sanborn Map.

The **Paper Machine Building** (HAER No. MA-139-B), located at the southwest corner of the site, was constructed in 1928[5] by the Champion-International Paper Company to accommodate the plant's enormous Fourdrinier, or flat-wire, machines, which are designed to make long, continuous sheets of paper at very high speeds.[6] From the time of their invention, these machines steadily increased in size, until they required huge buildings to accommodate them.

> *In 1847, the machines used in the United States were almost insignificant in size compared with those that were to come after. When the Chelsea mill, in Norwich, Connecticut, put in an 84 inch machine, it was considered a wonder. Previous to 1867, the width of the widest machine was not more than 100 inches, and the maximum speed did not exceed one hundred feet per minute. ... Thirteen years later, in 1880 a Fourdrinier was built ... that had a speed of 200 feet per minute. From that time on, the pace was steadily increased, and, by 1897, there were machines 160 inches wide, capable of making newsprint at 500 feet per minute.*[7]

The Paper Machine Building is abutted on the south by Canal Street, on the north by the raceway, on the east by the railroad spur track (former location of Spicket Street), and on the west by the access road from Canal Street. The two-story, steel-framed, brick pier structure, approximately 36,480 square feet in area, has large industrial windows framed by reinforced concrete sills and lintels. A concrete-capped, brick parapet wall rises above the roof line at the southern (Canal Street) facade of the building while a brick corbelled cornice caps the end panels at the southwest and northwest corners.

The Paper Machine Building is typical of industrial architecture of the early twentieth century, incorporating steel roof and floor framing which, in addition to being more fire-

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[5] Maurice B. Dorgan, History of Lawrence, Massachusetts (Published by author, 1924), p.52. Dorgan indicates that numerous mill buildings were built in Lawrence in the years following World War I, including Champion-International's "*paper manufactory on Canal Street.*" L.J. Richards 1926 map does not show new building.

[6] According to World Book Encyclopedia, modern Fourdrinier machines can make a continuous sheet of paper up to 33 feet wide at speeds faster than 3,000 feet per minute.

[7] Paper Trade Journal, Progress of Paper, 75th Anniversary Edition (New York: Lockwood Trade Journal Co.), p.112.

resistant than timber, afforded better work-space lighting by allowing more of the wall to be given over to windows than was possible in masonry construction.

The ground floor level of the Paper Machine Building is approximately three feet above grade and consisted of one large room with two smaller storage rooms along the eastern side, approximately 20 feet wide and running the length of the building. Several areas of the concrete floor are open to the first of two basements.

Attached to the rear (north) wall of the building and spanning the raceway are the ruins of a 20' x 20' nineteenth century brick Engine House. Although its exact date of construction is unknown, it appears on the 1888 Sanborn map and is clearly labeled "Engine House" on all subsequent maps. Its segmentally arched windows also provide evidence of its later nineteenth century construction date.

The cluster of four **Clay-Storage Silos** (HAER No. MA-139-C), was built c.1930 (and rebuilt in 1944)[8] at the southeast corner of the site. The silos are constructed of structural tile and surmounted by a 20' x 20' wood-frame penthouse with monitor and mounted on a 41' x 41', one-story high reinforced concrete base which housed the clay mixing room. The entire structure occupies an area measuring roughly 1600 square feet and is approximately 80 feet high. An iron strap binds each tile course on three of the four silos. The tiles on the fourth silo appear newer and are not strapped. The silos were originally constructed sometime between 1923, when there is no structure shown in this location, and 1931 when they first appear on a fire insurance map of the Champion-International Company. Although little documentation was found concerning this structure's function, 1931 and 1951 fire insurance maps indicate that the penthouse housed electric hoisting equipment and the reinforced concrete base housed the mixing room.[9] The silos were used for storing clay, an essential ingredient in the manufacture of coated paper which, for nearly seventy years, was the Champion-International Paper Company's specialty.

Another prominent feature of the site, the stone masonry raceway, measuring approximately 15 feet deep and 20 feet wide, conveyed water from the North Canal to the paper mill complex via a penstock under Spicket Street (later the rail spur right-of-way) and two intake raceways on the west side of the former Everett Mills complex. As a tailrace, it discharged spent water to the Spicket River along the eastern portion of the paper companycomplex.[10] The open raceway runs eastward along the north side of the two main paper mill buildings, the gunited foundation walls of which also form the south wall of the raceway. It is spanned by the ruins of a small brick engine house, now empty of machinery, attached to the rear of the Paper Machine Building and by the adjacent stone arch bridge which supports a railroad spur track running north-south between the two buildings. The bridge is approximately 30 feet wide and consists of two stone arches, each spanning about 13 feet. The top of the bridge is about 15 feet above the crown of the arches. A portion of the northern arch has collapsed

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[8] The silos first appear on a 1931 fire insurance map, but later maps and plans label the structure with a 1944 date. No further information was found concerning the construction of these silos.

[9] Associated Factory Mutual Fire Insurance Company, [Plan of] "Champion-International Company, Lawrence, Mass.," September 21, 1931. Collection of American Textile History Museum, Lowell, Massachusetts.

[10] D.G. Beers, J.H. Goodhue and H.B. Parsell, Atlas of Essex County, Massachusetts (Philadelphia: D.G. Beers & Co., 1872).

and fallen into the raceway below. A steel I-beam pedestrian bridge spans the tailrace at the mouth of the Spicket River.

The 1888 Sanborn Insurance Company map indicates that the paper mill's machines were then powered by both water and steam; subsequent Sanborn maps indicate a combination of steam and electric power. The raceway first appears on D.G. Beers's 1872 map of Lawrence, but it may, in fact, be older. Water was drawn from the North Canal through a system of valves and pipes under Spicket Street, to a penstock leading to the water wheel on the north side of the Paper Machine Building (labeled on the 1888 Sanborn map); in 1928, when the Paper Machine Building was replaced, the northwest corner of the Wilder Mill was rebuilt to accommodate a new, much larger water wheel.[11] The water wheel converted the kinetic energy of the flowing water into mechanical energy which could then be transferred to the mill's machinery by means of a system of drive shafts and gears. After passing the water wheel, the spent water entered the tailrace which carried it to the Spicket River at the eastern end of the site.

Paper Manufacturing Technology

The first paper mill in America was established in 1690 at Germantown, Pennsylvania by William Rittenhouse. Paper at this mill was hand-manufactured from rags, one sheet at a time on a hand-held wire screen mould, using methods similar to those used in China 2,000 years earlier. Throughout the eighteenth century, as the population grew and literacy increased, demands on the paper-making industry led to significant advances in mechanical methods of paper manufacture, including the invention of several machines: the Hollander beater in 1750, Nicholas-Louis Robert's continuous-roll paper machine in 1798, and Henry and Sealy Fourdrinier's adaptation of the flat-wire machine in 1803. These improvements made paper production much more economical, and subsequently resulted in a search for alternative raw materials when the growth of the industry outpaced the supply of rags. With late-nineteenth century refinements in machinery and the establishment of wood pulp as the standard source of paper fibers, "*the ancient traditions of a hand craft were transformed into a modern industry.*"[12] By the end of the nineteenth century, the majority of the nation's paper mills were fully mechanized and manufacturing paper from wood pulp. Modern paper mills are fully automated, but the basic paper-making process has changed little during the past century. This process is summarized below.

Wood was brought to the site on railroad cars which ran on a spur track and wooden trestle from Canal Street, through the center of the site to the north side of the Spicket River. The logs were unloaded by conveyor and piled in the wood yard, noted on Sanborn maps as, "*Piles of Pulp Wood 30' High.*"[13] The logs were prepared in the pulp mill which occupied the northwest quadrant of the present site. After the bark was stripped, the logs were cleaned and chipped into small, uniform pieces. The chips were then loaded into digesters which were located in, or adjacent to, the pulp mill. In the chemical mill, located in the northeast

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[11] Sanborn Map Company, Insurance Maps of Lawrence, Massachusetts (New York: Sanborn Map Company, 1888, 1895, 1911, 1949 and 1956).

[12] Sophie Dawson, The Art and Craft of Paper-Making (Philadelphia: Running Press, 1992), p.14.

[13] Sanborn Insurance Company, Map of Lawrence, Massachusetts, 1956.

quadrant of the present site, various pulping liquors were mixed and stored. Inside the digesters, the wood chips were boiled with these chemical liquors to dissolve the lignin and resinous materials that bound the wood fibers together. The end result was wood pulp. Different grades of paper could be made by utilizing one of three chemical processes: sulphite, soda and sulphate. The mill at Lawrence utilized both processes at various times during its history.

Following the digesting process, the wood pulp was washed and passed through a series of screens to remove knots, debris and other foreign material. Sometimes the pulp was bleached to make whiter paper. The pulp was refined by machines known as beaters, which unraveled the fibers and made them more pliable. At various times, the beaters were located in the Wilder Mill, the chemical mill or Building No. 3. *"The purpose of this refining stage is to prepare the pulp for optimum performance on the paper-making machine, so that the individual fibers actually lie down in proper formation."*[14] The amount of refining the pulp receives at this stage determines the quality of the finished paper.

Paper was formed into long, continuous sheets in the Fourdrinier, or flat wire, machine. A headbox spread the wood pulp across a moving, continuous wire screen which allowed the water to drain off and the fibers to mat together on the surface, forming a paper web. The web of fibers then passed between large felt rollers that squeezed water from the sheet. Most of the remaining water was removed as the sheet passed over steam-heated drying cylinders. In the operation known as calendering, the paper was given a smooth surface finish by pressing it between highly polished steel or cast-iron rollers, before winding the finished paper into a roll. For many years, the paper machine was located in Building No. 3, which occupied the southwest quadrant of the site. In 1928, the increased size of the Fourdrinier machines necessitated construction of a large new Paper Machine Building at that location.

The physical properties of finished paper depend on a number of factors, including the type of wood, the amount of refining of the pulp, and the type of machinery used. Special additives and treatments during or after the manufacturing process also affect the finished product. For example, writing and printing paper is sized with starch to prevent ink from spreading into the paper, special dyes are used to create colored papers, and paper used for magazines and books is coated with a mixture of starch and clay to produce a glossy surface. The Champion-International Company (1902-1958) was renowned for its production of coated paper stock, and an enormous coating mill was located on the east side of the Spicket River from 1902 until the 1970s.

The following is a first-hand account of the paper-making process at the Russell Paper Mills about 1895. The description was written by Ralph Bicknell when he was fourteen years old, and was featured in a book compiled by his father shortly after Ralph's death in 1905:

> *As the sticks come into the mill, those that are too large are put through a splitting machine and then cut into pieces about two feet long. The bark is sawed off ... and the knots are bored out by a sort of drilling apparatus. The dust and dirt is taken off the sticks by a swiftly revolving brush, leaving them perfectly clean.*

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[14] Bobbi White, "Making the Grades," Desktop Publishers, March 1997, p.58.

A machine something like a coffee grinder is the next receptacle into which the wood is put. This machine chops it up into small pieces about the size of a man's thumb. ... After the chopping up process, the small pieces of wood are put into a large, circular, iron vat called a "digester."... While in this vat, a liquor is added to it and the two are boiled. The liquor is made from water and sulphur and is prepared in the mill. ...

When the chips of wood come from the "digester" they are pulp.... The pulp, which is now unbleached, is pumped into canals which are arranged in different parts of the mill. These canals are about three feet wide and three and a half high. The bottom is on an incline, so that the pulp, which has been mixed with water, will flow through them readily. While going through the canals, the pulp is made finer by a kind of chopping arrangement, and is also bleached. When it has gone through one canal, it is pumped into another, and the process repeated. ... After the pulp is bleached and made as fine as possible, it is taken to a machine that makes it into thin sheets about one-sixteenth of an inch thick.

It is now ready for the machine that makes it into finished paper. It is immersed in the water, and then goes through a number of felt rollers which squeeze the water from it, and thin the sheets to the required thickness, leaving them in a damp condition. A succession of very hot rollers now serve as a clothes-wringer, and our paper is nearly completed. The finishing touch is accomplished by running the dried paper through five or six rollers made of chilled steel, which puts the gloss on it.

As the finished paper comes from the machinery it is wound on a sort of spool, which, with the paper on it, looks like a gigantic spool of thread. It is all ready now to be sent away to the company's customers, which are, to say the least, numerous.

The book paper is usually shipped in rolls, but card boards, blotting papers, writing papers, etc., are cut into pieces about twenty-eight inches by twenty-four inches, and sent out in bundles.

The Russell Paper Co. makes no newspaper, the principal products being label, lithograph, bristol, writing and blotting papers.[15]

The Founding of Lawrence

The industrial success of the City of Lowell, established in 1822, caused Boston financiers to examine other sites along the Merrimack River for similar industrial developments. In 1844, surveys of the river indicated a potential spot at a location known as Bodwell's Falls, "[where], *by the erection of a permanent dam, a grand water-power, equal to that at Lowell,*

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[15] Ralph Edmund Bicknell, "How Paper Is Made," in Ralph's Scrapbook, Illustrated by His Own Camera and Collection of Photographs, and Compiled by His Father Edmund Bicknell (Lawrence, Massachusetts: The Andover Press, 1905), pp.88-91.

might be developed, and a manufacturing city established."[16] The following year a group of financiers and businessmen chartered the Essex Company for the purpose of constructing a dam at present-day Lawrence and creating water power for manufacturing purposes. Construction of the dam began in the summer of 1845 and was completed three years later. At the time of its construction, the dam was said to be *"the most massive structure of the kind in the country."*[17] Under the direction of Chief Engineer Charles Storrow, the Essex Company laid out plans for a new industrial city. According to historical accounts, the city developed rapidly.

> *By the end of 1846 the "new city" made great progress; in addition to the large mills already mentioned, the Essex Company had commenced the great Machine Shop and Foundry, and private enterprise had commenced numerous fine stores and dwellings. Religious and benevolent societies had been organized, schools established, and the various professions and industrial pursuits settled down on a permanent basis.*[18]

Although the city's main industrial efforts were devoted to the manufacture of textiles, Lawrence's other early enterprises included the manufacture of paper and paper machinery. Because the paper industry was dependent upon water for both power and processing, and a steady supply of linen and cotton rags, the two industries were often established in proximity to one another. A.&A. Norton pioneered paper manufacturing at Lawrence, purchasing property at the corner of Canal Street and the Spicket River in 1853. The following year, nearby paper mill sites were purchased by the Lawrence Paper Company, Samuel S. Crocker, and William Russell & Son.[19]

William Russell & Son (1853-1864)

William Russell was born at Cabot, Vermont in 1805. The son of a farmer, he was educated in the local public schools. As a young man he apprenticed with a paper manufacturer at Wells River, Vermont. In 1848 he moved to Exeter, New Hampshire, where he built and operated two paper mills.[20]

Russell's son, William Augustus Russell (William A. Russell), was born at Wells River, Vermont on April 22, 1831. He was educated in the public schools and during his vacations worked in the paper mills in Franklin, New Hampshire. He completed his education in a private school at Lowell, Massachusetts, and in 1848 went to work at his father's paper mill in Exeter, New Hampshire. In 1853 the father and son formed a partnership, purchased land and water rights, and established a paper mill at the corner of Marston and Canal streets in

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16 Cyrus Mason Tracy, Standard History of Essex County, Massachusetts (Boston: C.F. Jewett & Co., 1878), p.212.

17 Maurice B. Dorgan, History of Lawrence, Massachusetts (Cambridge: Murray Printing Co., 1924), p.27.

18 "History of Lawrence," in Lawrence City Directory 1853-54 (Lawrence, Massachusetts: 1854), p.109.

19 Tracy, p.225. A map from the 1857 Lawrence City Directory shows two small buildings on the Canal Street site and four small buildings on the Marston Street site, all labeled *"paper mills."*

20 Duane Hamilton Hurd, History of Essex County, Massachusetts, vol. I (Philadelphia: J.W. Lewis & Co., 1888), p.901.

Lawrence, Massachusetts.[21] When his father retired the following year, William A. Russell took over the business. Shortly thereafter, "[Russell] *found it necessary to enlarge his facilities for manufacture in order to meet the demand for his products.*[22] In 1856 he purchased a lot at the northwest corner of the Canal Street site just east of the Everett Cotton Mills, adjacent to several other paper manufacturers.[23]

Russell Paper Company (1864-1898)

In 1864, the company was incorporated as the Russell Paper Company. During the Civil War, when a number of paper manufacturers went out of business or moved to new locations, Russell purchased their mills and expanded his business. "*His confidence proved well founded, and after a short period the business received a fresh impetus and continued to increase each year in importance.*"[24] The years following the Civil War were prosperous ones, "*Old mills were expanded, improved machinery and methods were introduced and new mills on a scale heretofore unthought of were built.*"[25] Maps of Lawrence from the 1870s show that by 1875 the Russell Paper Company had expanded their mill site on Marston Street, and occupied three of the four lots on the Canal Street site.[26] A written description of the company from 1878 indicates that the business was thriving:

> *The specialties in manufacture have been news, book, cap, and manilla* [sic] *papers, also cartridge and postal papers for government use. This company and firm have absorbed in turn, by purchase, the mills run for a time by Partridge & Curtis, the Norton Mills, and the Merrimack Paper Mills of Salmon W. Wilder, until the village of mills about Spicket mouth is one of the busiest spots in the country.*[27]

William A. Russell's pioneering efforts in paper manufacturing from wood pulp were one reason for the Russell Paper Company's success. Experimentation with wood pulp for making paper began in America during the 1820s, but problems were encountered in using the pulp in paper making machines. It was not until the 1850s that German inventor Heinrich Voelter developed chemical processes to sufficiently break down the wood pulp fiber. In the late 1860s, William A. Russell made arrangements for using this patented process in New

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21 This mill is still standing on the corner of Marston and Canal streets.

22 Lawrence Telegram, January 16, 1899, p.2.

23 Champion-International Co., "Plan of Various Lots Which Were Combined to Make up the Present Mill Property, 1925," Essex Company Records, File No. C, Drawer No. 10, Plan No. 20 [Collection of Immigrant City Archives, Lawrence, Massachusetts.] D.G. Beers's 1872 Map of Lawrence shows a cluster of paper mills located at the mouth of the Spicket River; according to Lawrence Directories, these mills included: J.A. Bacon, Russell Paper Co., Wm. Russell & Son, S.W. Wilder, and Munroe Paper Co.

24 Hurd, p.901.

25 Lyman Horace Weeks, History of Paper Manufacturing in the United States (New York: Lockwood Trade Journal Company, 1916), p.270.

26 G.M. Hopkins, City Atlas of Lawrence, Massachusetts (Philadelphia, 1875), pp.62-63. This map shows Russell Paper Company was operating on three of the four quadrants of the Canal Street site.

27 Cyrus Mason Tracy, "Lawrence," in Standard History of Essex County, Massachusetts (Boston: C.F. Jewett & Co., 1878), p.225.

England[28] and established wood pulp mills at Bellows Falls, Vermont; Franklin, New Hampshire; and Belfast, Maine.

> *The mill at Lawrence was instrumental in acquainting William A. Russell with the possibilities of the new raw material. He obtained the rights to build two large pulp mills, one at Franklin, New Hampshire, and another at Bellows Falls, Vermont. Later he bought the rights to manufacture ground wood under the Voelter patents in six New England states.*[29]

> *The paper industry watched ... with interest when* [Russell Paper Company] *introduced ground wood paper into the market, a feat in those earlier days, but now common in the manufacture of newsprint. Again* [the company] *led the way in the soda and sulphite processes of converting wood into high grade papers, which have revolutionized the paper industry of America. The sulphite mill of the plant is one of the first built in America. Here and across the water the acid proof lining method, developed successfully in the Lawrence mill, is used today in nearly every sulphite plant. Were it not for the enterprise of the* [Russell] *mill the method might have been unknown to the world, but Lawrence persistency and genius perfected it, and made it an integral part of the wood transforming process.*[30]

By 1888, the Russell Paper Company occupied the entire 3.16-acre Canal Street site, employed three hundred workers, and produced about twenty tons of paper a day.[31] The expansion included "*a large plant for the production of chemical wood pulp both by the soda and sulfite processes.*"[32] By 1895, the Russell Paper Company had vacated the Marston Street site and expanded the chemical mill in the northeast quadrant of the Canal Street site.[33]

The International Paper Company (1898-1901)

In the last quarter of the nineteenth century, wood pulp began superseding rag pulp as the material of choice for paper manufacture, and the extensive forests in northern New England attracted the paper companies to Maine and New Hampshire. The wood-pulp paper revolution created new problems for the industry. The first involved wood supply, which accounted for a general move toward the northeastern forests. The second problem involved

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28 Orra L. Stone, History of Massachusetts Industries: Their Inception, Growth and Success, vol. I (Boston-Chicago: S.J. Clarke Publishing Company, 1930), p.337; David C. Smith, History of Papermaking in the United States (1691-1969) (New York: Lockwood Publishing Company, 1970), pp.130-34.

29 Dard Hunter, Papermaking: the History and Technique of an Ancient Craft (New York: Alfred A. Knopf, Inc., 1947), p.379.

30 Claude M. Fuess, editor and Scott H. Paradise, compiler, The Story of Essex County (New York: The American Historical Society, Inc., 1935), p.392.

31 Hurd, History of Essex County, p.901; Sanborn Insurance Company, Map of Lawrence, 1888.

32 Hurd, p.901.

33 Sanborn Insurance Company, Map of Lawrence, 1895.

the amount of capital required for new mills and machinery, eventually leading to consolidation throughout the industry.[34]

> *Consolidation had to come. There were overproduction and falling prices. Ground wood pulp prices dropped from four cents per pound during the 1870s to as low as six-tenths of a cent per pound around the time of the industry's consolidation. Some mills closed; others went bankrupt; still others suffered from poor construction and poor management. By 1897 or 1898 many mills were either losing money or barely breaking even. As prices drifted lower, marginal mills were forced to the wall or into the hands of their competitors. The possible consequences of the savage competition led owners into attempts at controlling the market and eventually to formation of the International Paper Company.*[35]

On January 31, 1898, twenty paper mills in the Northeast merged to form the International Paper Company. "*The company acquired many of the most important mills manufacturing news* [newsprint] *in the eastern States, and, gradually, added other paper and pulp mills, wood lands and water power to its possessions.*"[36] The Russell Paper Company mills at Lawrence were among the consolidated mills, and William A. Russell, who was instrumental in founding the International Paper Company became the company's first President. When Russell died just one year later, on January 10, 1899, his son George Fred Russell (G.F. Russell) took over management of the paper mill at Lawrence. In 1901, G.F. Russell repurchased the paper mills at Lawrence from the International Paper Company,[37] apparently with the intention of finding a specialty market for the company.

Champion-International Paper Company (1902-1958)

In 1902, the Champion-International Paper Company was formed by the consolidation of the Russell Mills at Lawrence and the Champion Card & Paper Company at East Pepperell, Massachusetts.[38] Champion Card & Paper Company specialized in the manufacture of "*glazed and colored papers and card-boards of the finest quality, lithographic-plate paper being a specialty.*"[39] Shortly after the consolidation, an enormous coating mill was

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34 David C. Smith, History of Papermaking in the United States (1691-1969) (New York: Lockwood Publishing Co., 1970), p.153.

35 Ibid., p.167.

36 Paper Trade Journal, The Progress of Paper (New York: Lockwood Trade Journal Company, Inc., 1947), p.112.

37 Maurice B. Dorgan, Lawrence Yesterday and Today, 1845-1918 (Lawrence: Press of Dick & Trumpold, 1918), p.158.

38 Dorgan, Lawrence Yesterday and Today, p.158.

39 The Champion Card and Paper Company was established in 1880 as an adjunct of the Fairchild Paper Co. in Pepperell. In 1883 and 1887 it was incorporated as a separate company, first in New Hampshire, then in Massachusetts. Duane Hamilton Hurd, History of Middlesex County, Massachusetts, vol. III (Philadelphia: J.W. Lewis & Co., 1890), p. 245.

constructed on the east side of the Spicket River at Lawrence.[40] Changes were also made in the layout of the chemical mill, and a water tower was constructed in the southeast corner of the site. By 1911, the storehouse fronting on Canal Street had been extended, and a walkway constructed across the Spicket River between the storehouse and the coating mill. In 1928, additions were built on the storehouse and the chemical mill, a second railroad track was laid across the Spicket River to the wood yard, and Mill No. 3 was replaced with a much larger building to accommodate a huge Fourdrinier machine.[41]

For nearly seventy years, the Champion-International Paper Mill at Lawrence specialized in the production of coated paper. While some experimentation had been done on coated paper in the seventeenth and eighteenth centuries, it was not until the publication of periodicals on a regular basis that the demand for surface-coated paper necessitated its production in quantity. By the turn of the twentieth century, there were 28,806 regular daily, weekly and monthly publications in the United States,[42] and half-tone printing, first perfected in 1880, was becoming increasingly popular.

> *The essential feature of a coated paper which makes it superior for printing is the smoothness of its nearly plane surface. No matter how heavily a plain paper is calendered, or how smooth its surface appears to be, there are always roughnesses which prevent perfect contact of the halftone dots of the printing plate and which injure the appearance of the illustration. When a coating is applied it fills in the irregularities of the base paper surface and after calendering it presents a much more uniform surface to the printing plate, and thus permits a far more accurate reproduction of the dots of the half tones.*[43]

The coated paper produced by Champion-International was said to be *"of the finest grade obtainable."*[44] The increasing importance of coated paper in the publishing industry meant steady growth for Champion-International, and brought the company to the height of its production during the 1940s and 50s. While the company supplied paper to many of the country's leading magazines and publishing houses, the most prominent name in the company's ledgers was that of National Geographic.

The National Geographic Society

The National Geographic Society was founded in 1888, *"For the increase and diffusion of geographic knowledge."* The Society's journal, National Geographic Magazine was first

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40 The coating mill first appears on L.J. Richards's 1906 Atlas of the City of Lawrence and the Towns of Methuen, Andover and North Andover, Massachusetts.

41 Maurice Dorgan, History of Lawrence, Massachusetts, (Published by author, 1924), p.53.

42 Paper Trade Journal, Progress of Paper, p.315.

43 Edwin Sutermeister, The Story of Papermaking (Boston: S.D. Warren, 1954), p.171.

44 Fuess and Paradise, p.392.

published in 1888 and figured prominently in the evolution of photography and the use of photographs in periodicals.[45]

> *Between 1900 and 1920, the National Geographic Society gave black-and-white photography significant exposure world wide as a popular illustrational medium. The simple* [photographic]*halftone plate, starting in the* [1880s], *enabled photographs to be printed on the same presses as type, and would soon replace earlier methods of mass photographic printing ...Offset halftone reproduction–probably the oldest technique for printing photographs still widely used in the mass media–made its first appearance in National Geographic in 1889.*[46]

By 1908, photographs were occupying more than half the space in an 80-page magazine,[47] This necessitated the search for a supplier for large quantities of high-quality coated paper. Beginning in 1913, the Champion-International Paper Company supplied coated stock to National Geographic Magazine. An advertisement for Champion-International stated that their product was preferred, because *"its consistently superior quality guarantees brilliance and affinity for inks and results in excellent reproduction, both in black and white and in colors."*[48] National Geographic's insistence on top-quality paper came straight from the President himself, Gilbert Grosvenor, who emphatically stated: *"Without quality paper, a publication's other virtues–good printing, illustrations, und editorial content–are lost.*[49]

During both World Wars, the U.S. armed forces relied extensively on the Society's enormous collection of maps and photographs. National Geographic found that beyond the virtues of using coated paper for printing high-quality images in their magazines, durable paper stock was essential to fulfilling the Society's philosophy of compiling an archival repository of geographic information. While other map makers were printing maps on cheap paper to keep up with the rapid pace of geographic changes in the world, National Geographic insisted on high-quality paper stock, stating: *"Maps have great value as historic documents and must be printed on high grade paper that registers sharply and retains its texture and colors as time passes."*[50]

> *Nothing but the very best could meet the test applied by the National Geographic. Paper used in the magazine, with which 10,000,000 readers are familiar, is made to hold its tone and gleam for years on end. Especially essential is the keeping quality of official maps, made by the millions for the*

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45 Howard S. Abramson, National Geographic: Behind America's Lens on the World (New York: Crown Publishers, 1987), p.131.

46 Jane Livingston, Odyssey: The Art of Photography at National Geographic (Charlottesville, Virginia: Thomasson-Grant, 1988), p.27.

47 Frank L. Mott, "The National Geographic Magazine," in A History of American Magazines, 1885-1905, vol. IV (Cambridge: Harvard University Press, 1968), p.626.

48 Champion-International Company advertisement, Lawrence Eagle-Tribune, October 15, 1955, p.A-9.

49 Gilbert Grosvenor, The National Geographic Society and its Magazine (Washington, DC: National Geographic Society, 1936, republished 1957), p.110.

50 Bernard Peterson, "A Path Around the World on Paper," Industry, May 1952, p.11.

> *Government by the National Geographic, some of the paper for them being manufactured at the Lawrence plant.*[51]

The National Geographic Society became well-known for never letting expenses, large or small, stand in the way of their success. In 1935, "*to make certain that a dependable supply of coated paper would be available under all circumstances to keep up with the growth of the magazine,*"[52] the Society purchased the Champion-International Paper Company, which by that date was one of the largest coated paper manufacturing plants in the United States, employing 600 workers and turning out nearly 100 tons of paper per day.[53]

National Geographic operated Champion-International as a subsidiary organization, and various members of the Society served on the paper company's board of directors. By all accounts, the National Geographic Magazine and the Champion-International Paper Company carried on a mutually beneficial relationship for over 20 years:

> *Had they been less insistent on quality as the watermark of the National Geographic Magazine, Champion-International might not have got such a solid foundation as it has today. Being owned 100 percent by National Geographic, Champion-International can always count on the Magazine to absorb one half of its annual output, and it is well equipped by managerial efficiency and production ability to hold its own in the open field of competition.*[54]

From 1901 to the end of 1950 the gross value of the Champion-International's land, buildings and equipment in Lawrence had increased from $615,556 to $5,833,272. Gross volume of sales during the first full year of operation, 1903, was 9,449 tons; in 1950 the volume was 30,999 tons.[55] Between 1948 and 1958, the Champion-International Company invested more than $7,500,000 to improve equipment, modernize buildings and provide additional space for its operations. "*These expenditures made possible increases in production and the improvement of methods used in manufacturing and processing.*"[56] A major portion of this modernization program occurred in 1951. The improvements, mainly involving the installation of new machinery, were described in the May 1952 issue of Industry magazine:

> *An intensive program of modernization and improvement of the Lawrence plant was carried on during 1951, especially along two categories–those which expand or improve manufacturing directly, and those which improve the indirect phases of mill operation, such as shipping facilities, employee welfare and housekeeping. The Company's "Soda Pulp Mill" for instance, one of the thirty-two buildings in the establishment, received a good share of attention;*

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51 Ibid., p.10.
52 Ibid., p.48.
53 Fuess and Paradise, p.392.
54 Peterson, p.48.
55 Ibid., p.8.
56 John J. Leane, The Oxford Story: A History of the Oxford Paper Company, 1847-1958 (Rumford, Maine: Oxford Paper Company, 1958), p.39.

the wood yard conveying system was rearranged and expanded. Two new Zaremba evaporator bodies were added to the recovery system, making possible the first application of the falling film principle in a soda mill.

In the "Paper Mill" the year's modernization emphasis was on stock preparation. To add to the refining capacity and flexibility the Company installed a 48" Sutherland Refiner and a No. 3 Emerson Jordan. Dirtecs were installed in No. 1 Paper Machine, and a waste paper recovery system was introduced, consisting of a Dynapulper, a Three-stage washer and auxiliary equipment.

The Coating and Finishing Mills were improved with the addition of a Seybold 84" cutter, a new elevator, calender changes and a Rice-Barton rewinder. New mixing and coating equipment represented a very substantial investment. Additional investment was made also in the Company's forestry program and experimental woods operation. It is said that these activities are contributing importantly to the advancement of sound scientific forestry practices in the southern New England area.[57]

In January 1957, John Oliver La Gorce retired as President of the National Geographic Society, marking the end of the old guard era. La Gorce's successor was Melville Bell Grosvenor, son of Gilbert Grosvenor. Under his leadership a number of changes took place at the National Geographic Society, including *"streamlining the organization's operating procedures."*[58] Just 15 months later, National Geographic sold the Champion-International Paper Company mill at Lawrence to the Oxford Paper Company of Rumford, Maine.[59]

Oxford Paper Company (1958-1972)

On April 1, 1958, the Lawrence Evening Tribune announced that Oxford Paper Company had signed a contract to buy out Champion-International:

The signing of a contract whereby the Oxford Paper Company will purchase all the outstanding capital stock of National Geographic's wholly-owned subsidiary, the Champion-International Company on Prospect street was announced jointly Tuesday by Dr. Melville B. Grosvenor, president of the National Geographic Society and William H. Chisholm, president of the Oxford Paper Company. The closing date for this transaction is June 4.

At the same time, it was announced that Oxford has entered into a long-term contract to supply the paper requirements for the National Geographic magazine. ... In making this announcement, Dr. Grosvenor said: 'We are

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57 Peterson, p.10.

58 Abramson, p.198.

59 An inquiry to the research department at National Geographic Society headquarters in Washington, DC. revealed no documentation pertaining to Grosvenor's decision to sell the paper company. It is reasonable to conclude that the decision was based purely on economics. It is also quite likely that by 1958, paper manufacturing technology had advanced to the point where a consistent product was virtually guaranteed, and therefore, the Society had less need to directly oversee the manufacturing process.

> *delighted to have made this association with the Oxford Paper Company, one of the leading producers of high quality printing paper in the country.*"[60]

During 1956 and 1957, the Oxford Company, under the leadership of William H. Chisholm, was preparing for a new venture in coated paper manufacturing. Obsolete equipment was replaced with state-of-the-art-machinery, including "*The North Star Coater, the first trailing blade off-machine coater in the paper industry...* [which became] *the basis for today's coated machines.*" The 15-year contract with the National Geographic Magazine would ensure "*full production for the North Star Coater.*"[61] At the time of the 1958 purchase, the plant at Lawrence was extensive, as the following description attests:

> *The mill has two paper machines, five coaters, a soda mill for producing pulp, two hydraulic turbines that drive 500 kva and 1,000 kva electric generators, a steam plant, finishing departments, a shipping department, and other auxiliary departments. With this equipment Champion-International is making about ten different grades of fine quality coated paper. With a production of about 35,000 tons annually, it has been rated second in conversion coating by volume throughout the country. There are 725 employees with a three to four million dollar yearly payroll.*[62]

The Oxford Paper Company was listed in Lawrence City Directories from 1959 through 1972. During this time, in an effort to expand the company's operations without borrowing money, company president William Chisholm was pursuing merger possibilities, "*particularly in the chemical industry because of the chemical nature of paper manufacturing.*"[63] In 1967, the Oxford Paper Company merged with the Ethyl Corporation of Richmond, Virginia, a merger which "*coincided almost exactly with a drastic decline in paper prices, part of the cyclical pattern of the paper industry.*"[64] In 1972, because the paper company did not hold financial promise for the Ethyl Corporation, employees were laid off, a portion of the Rumford, Maine plant shut down, and the plant at Lawrence was closed and sold to Pleasant Valley Paper Mills, Inc.

Recent History (1974-Present)

On July 28, 1973, a five-alarm fire destroyed much of the Pleasant Valley Paper Mills complex and it was never rebuilt. At the time of the fire, the mill's workforce was said to number about 70 employees.[65] Less than one year later, on April 29, 1974, the mill's operations ceased and the site was obtained through foreclosure deed by a group of local investors who began subdividing it. Portions of the site were purchased by Lawrence General Hospital and are presently used for parking lots.

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60 "Oxford Paper Will Buy Champion-Int'l Plant," Lawrence Evening Tribune, April 1, 1958, p.1.

61 Elliot E. Burns, "History of the Oxford Paper Company From 1958 to 1992," The Oxford Story, p.47.

62 Leane, p.39.

63 Burns, p.52.

64 Ibid.

65 "Paper Mill Fire Losses May Hit $750,000 Total," Lawrence Eagle-Tribune, July 30, 1973, p.1.

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No company records have been found.

Engineering Drawings

No architectural or engineering drawings have been found.

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"Russell Paper Mills--Lawrence," c.1895, in Ralph's Scrapbook, Illustrated by His Own Camera and Collection of Photographs, and Compiled by His Father Edmund Bicknell, by Ralph Edmund Bicknell. Lawrence, Massachusetts: The Andover Press, 1905, p.84.

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View of Clay Storage Silos, c.1950. Collection of Immigrant City Archives, Lawrence, Massachusetts, ICA #95.70.03.

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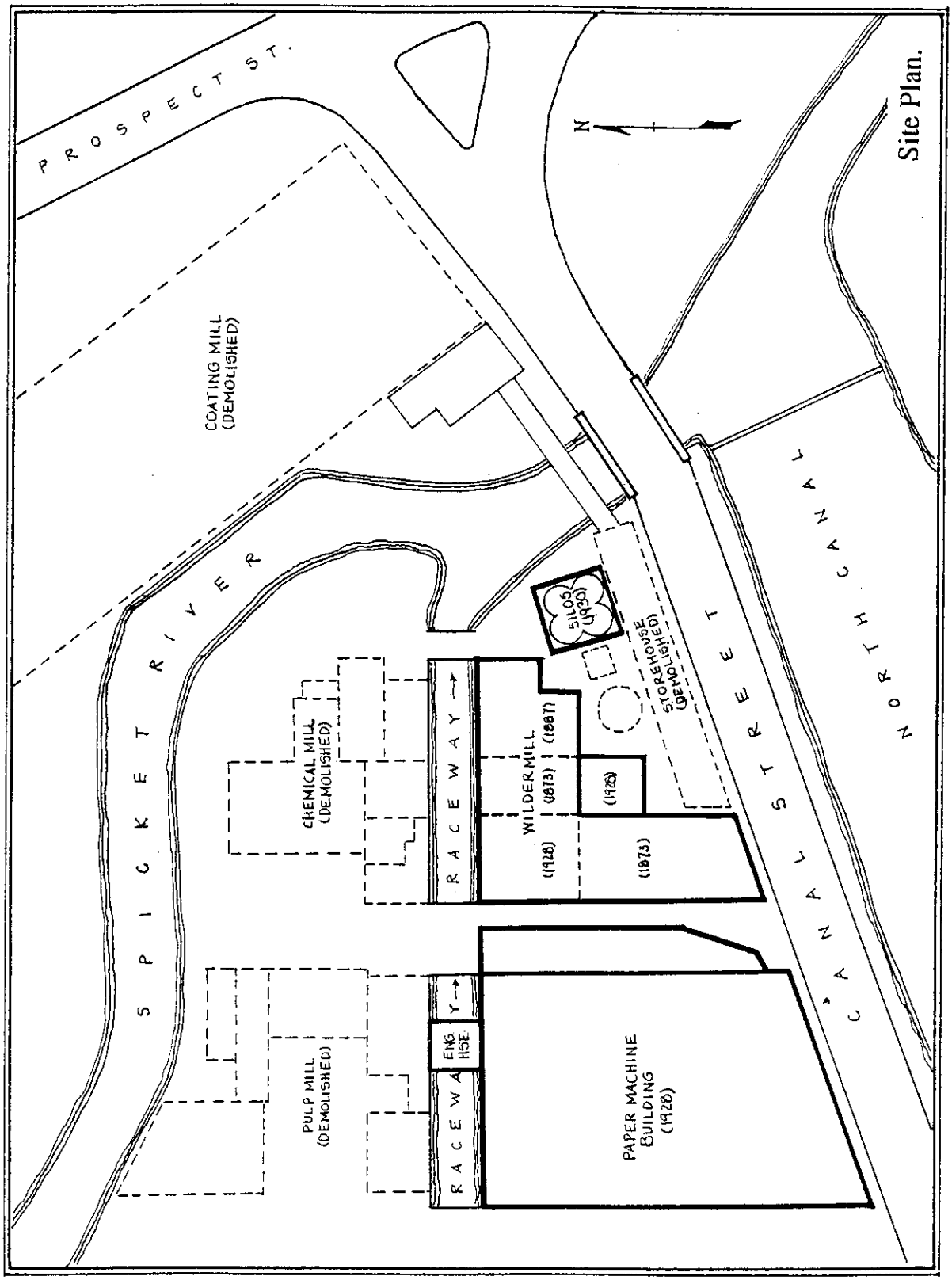
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COATING MILL (DEMOLISHED)
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(1887)
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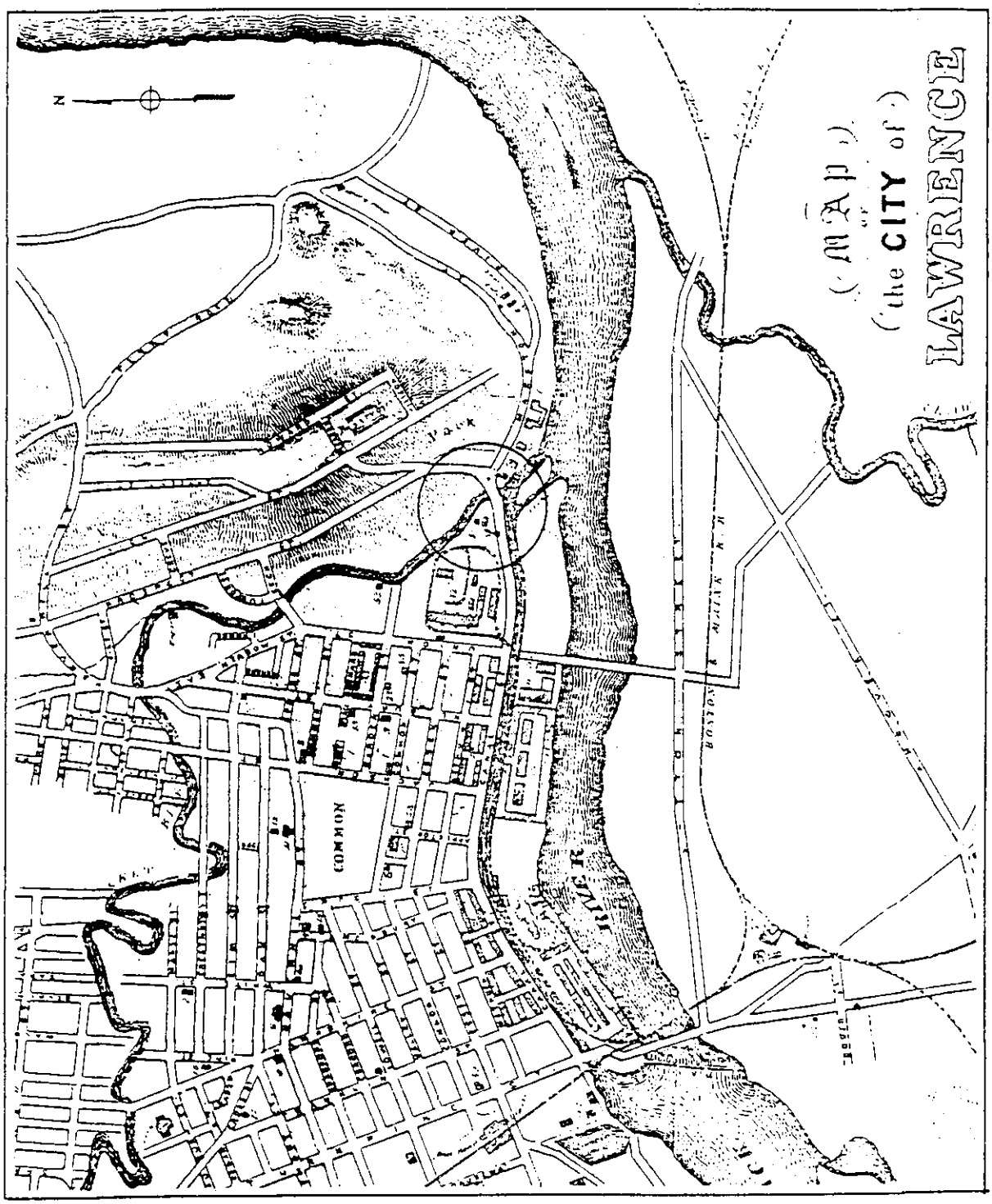
(1873)
SILOS (1930)
STOREHOUSE (DEMOLISHED)
CANAL STREET
NORTH CANAL
PULP MILL (DEMOLISHED)
RACEWAY
ENG HSE
PAPER MACHINE BUILDING (1928)

Site Plan.



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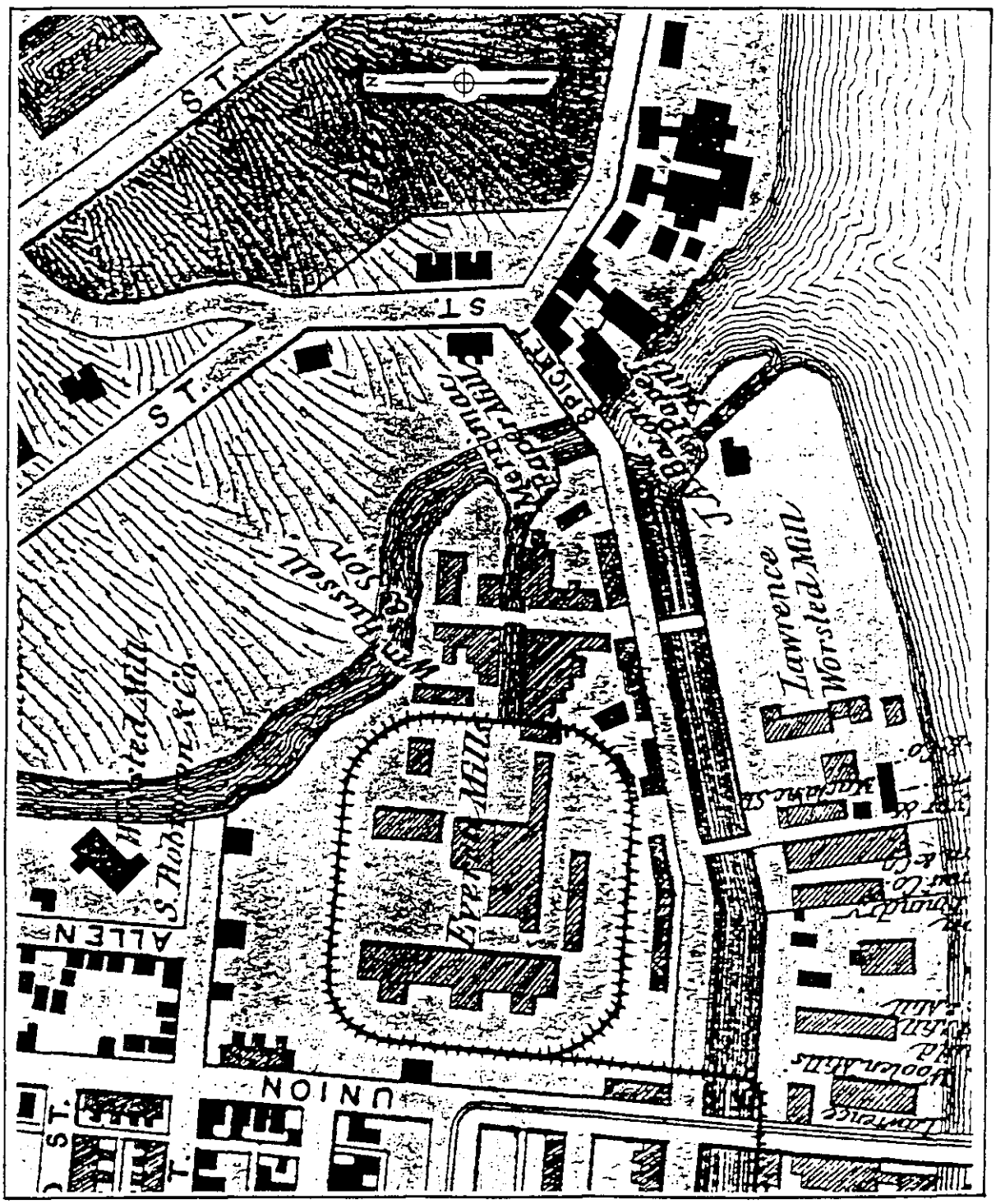

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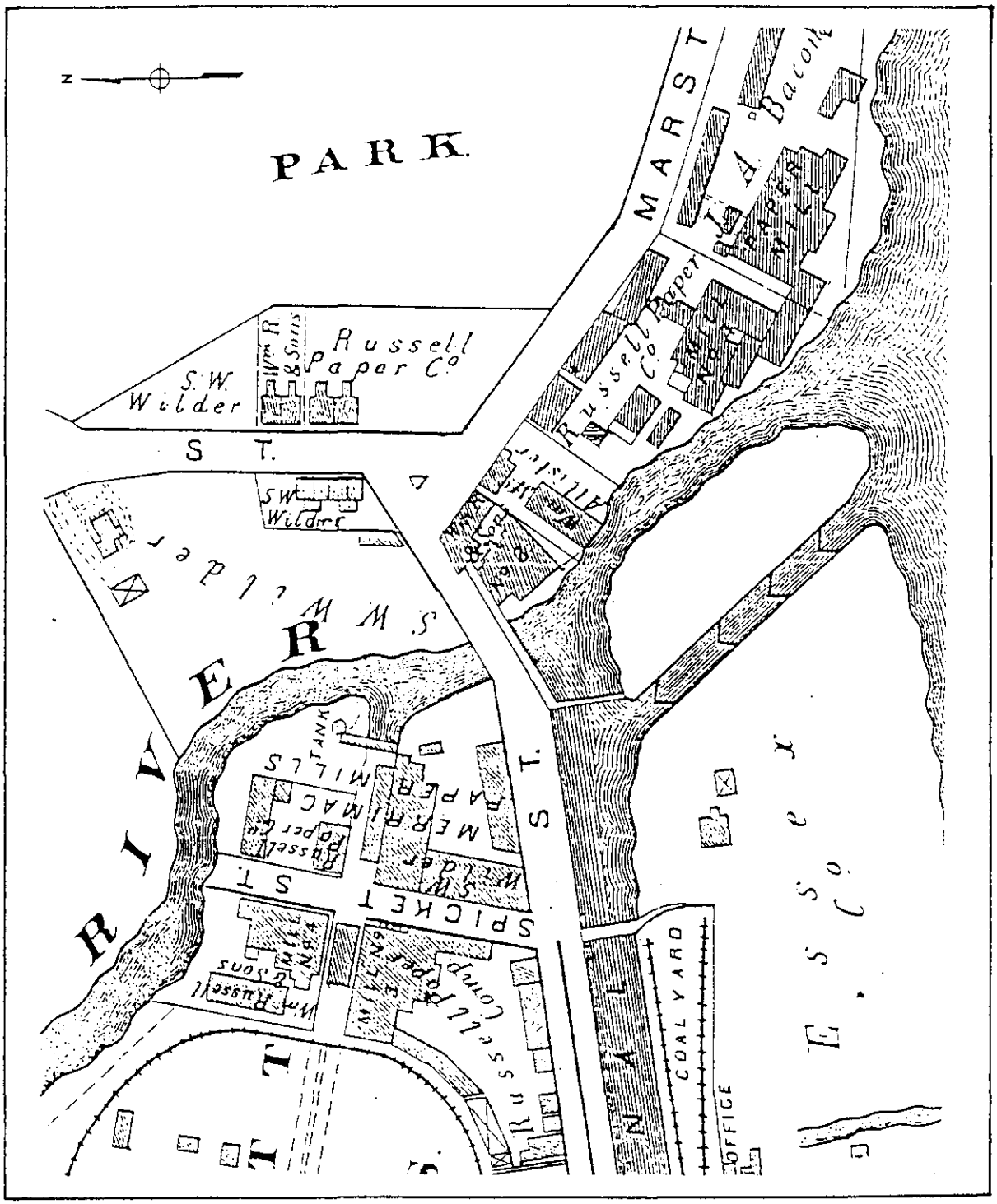

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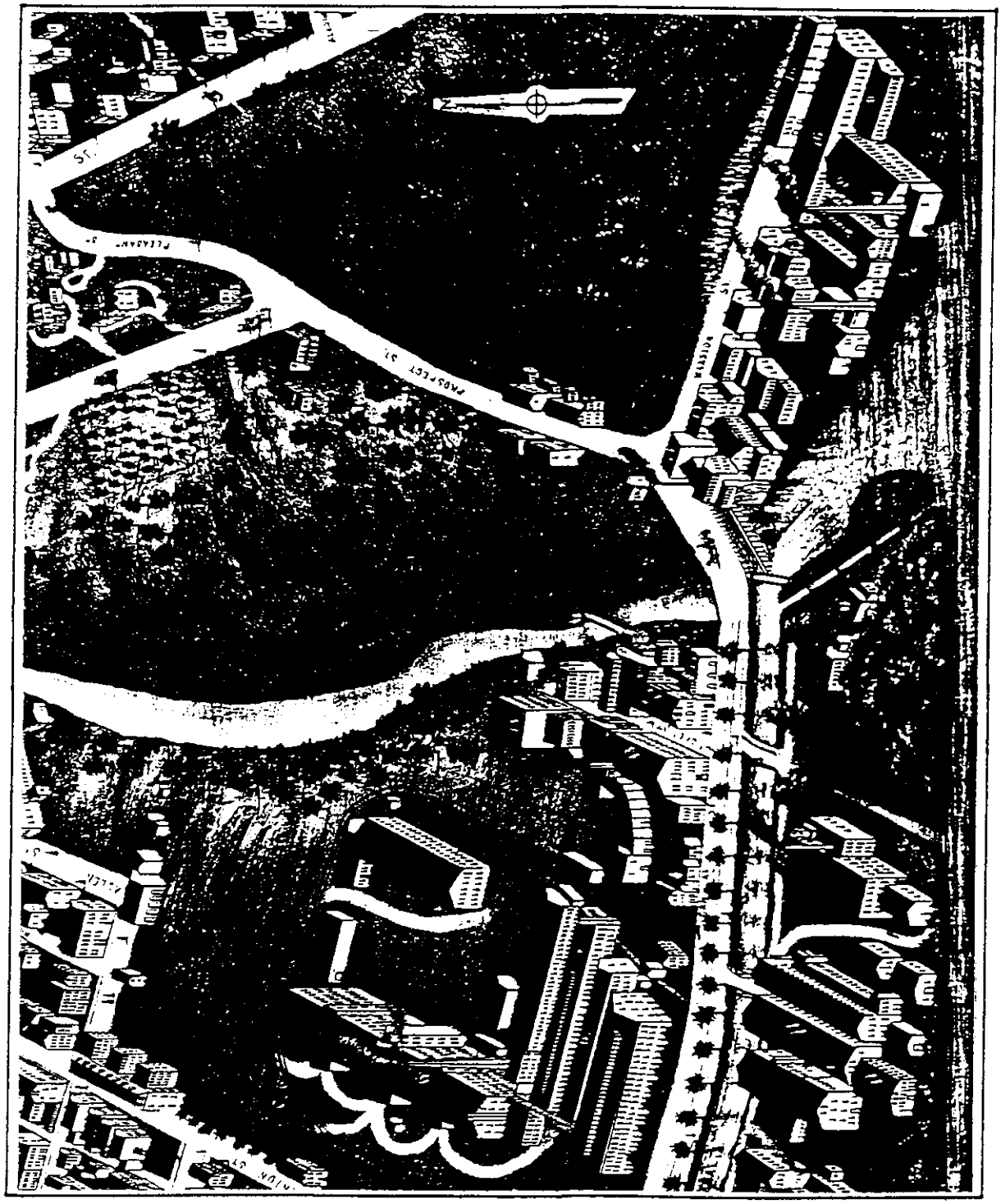

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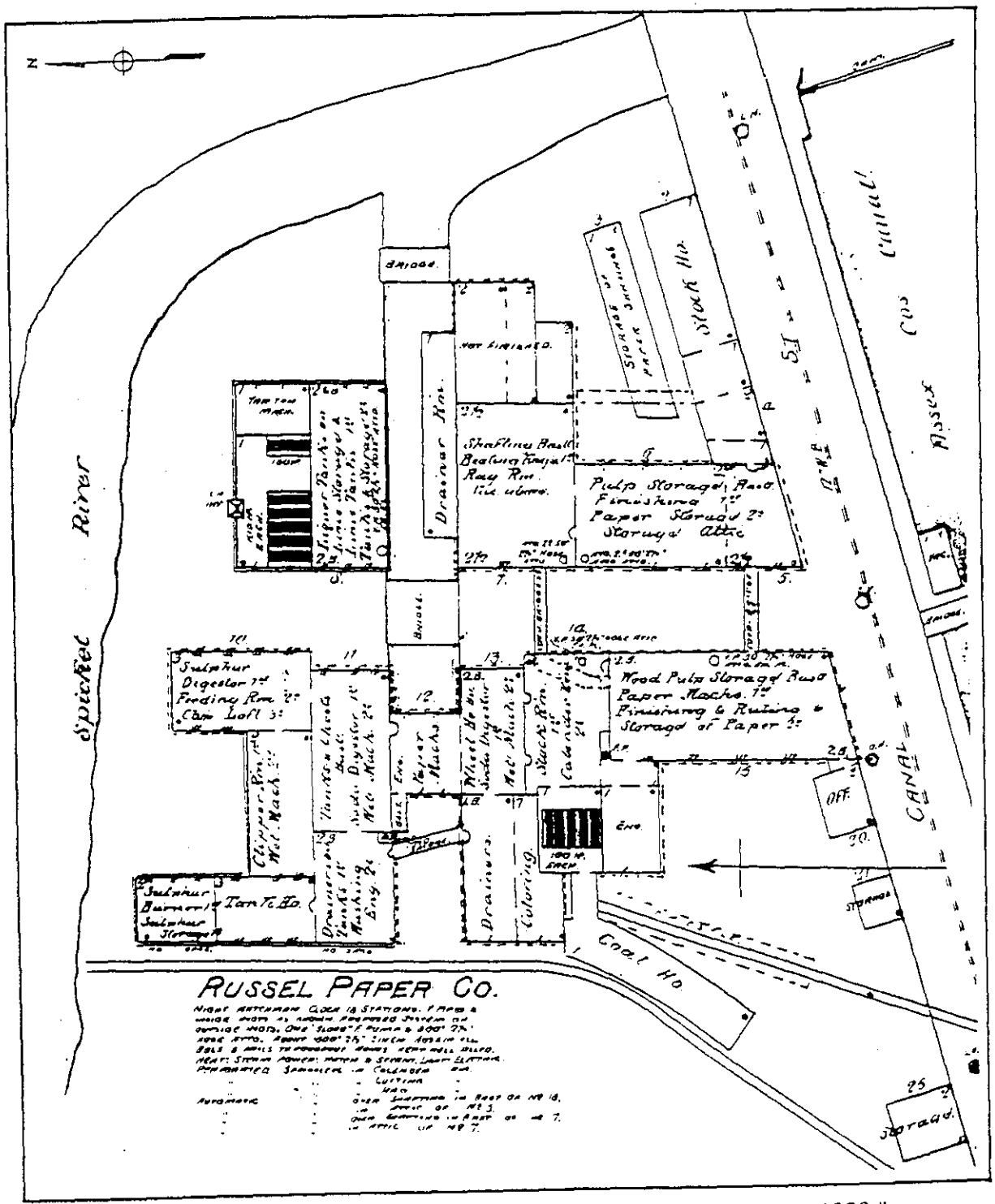

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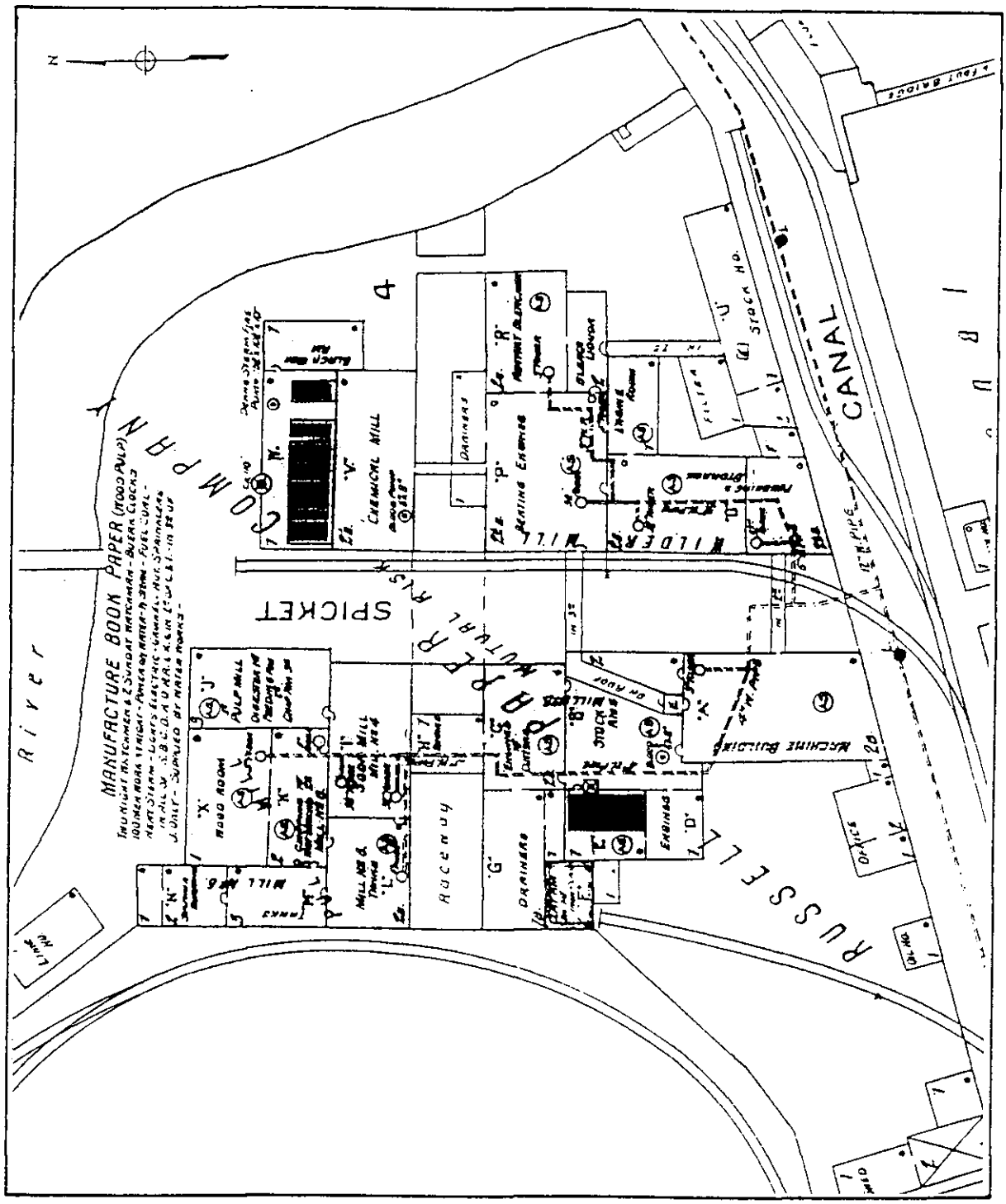

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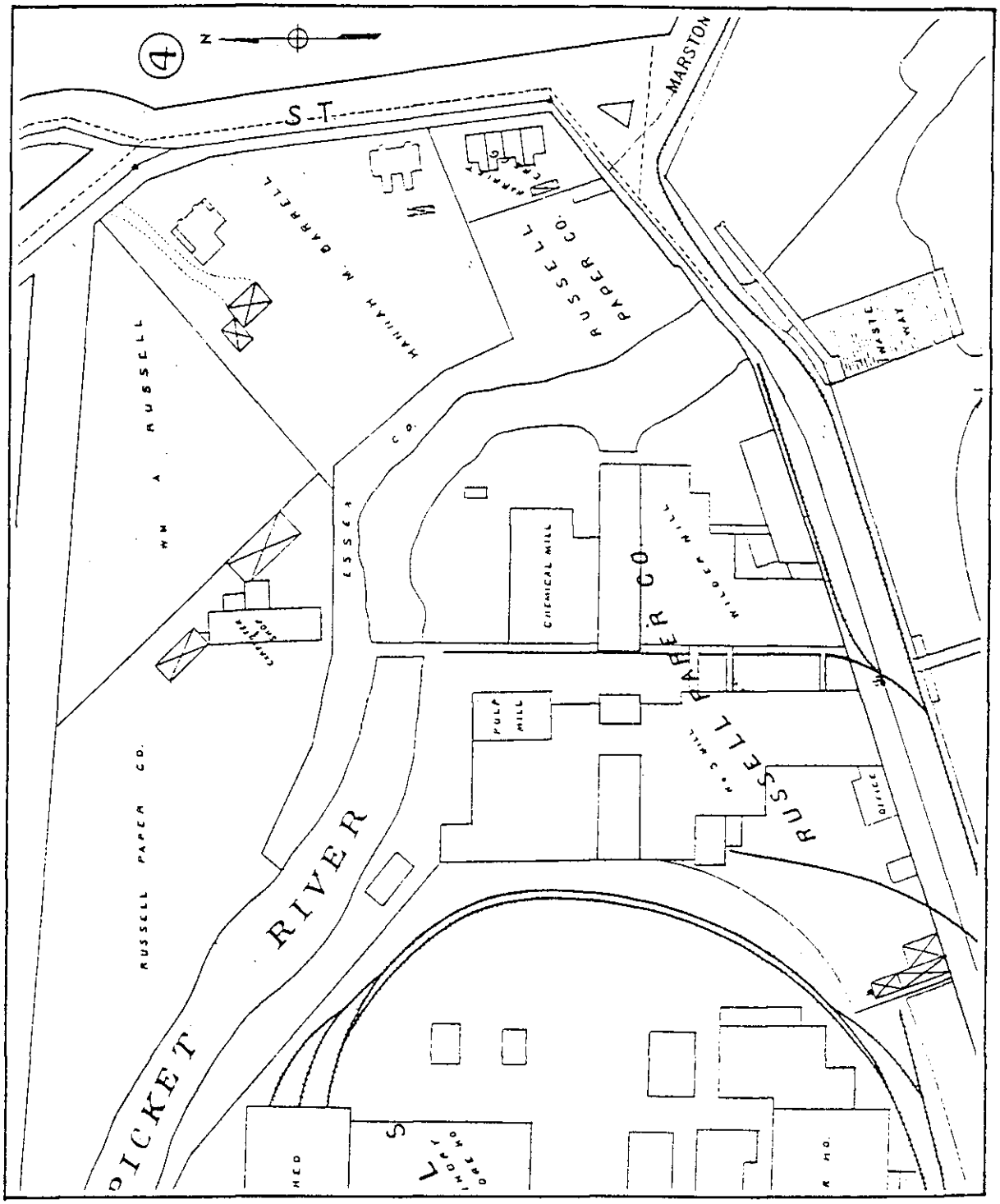

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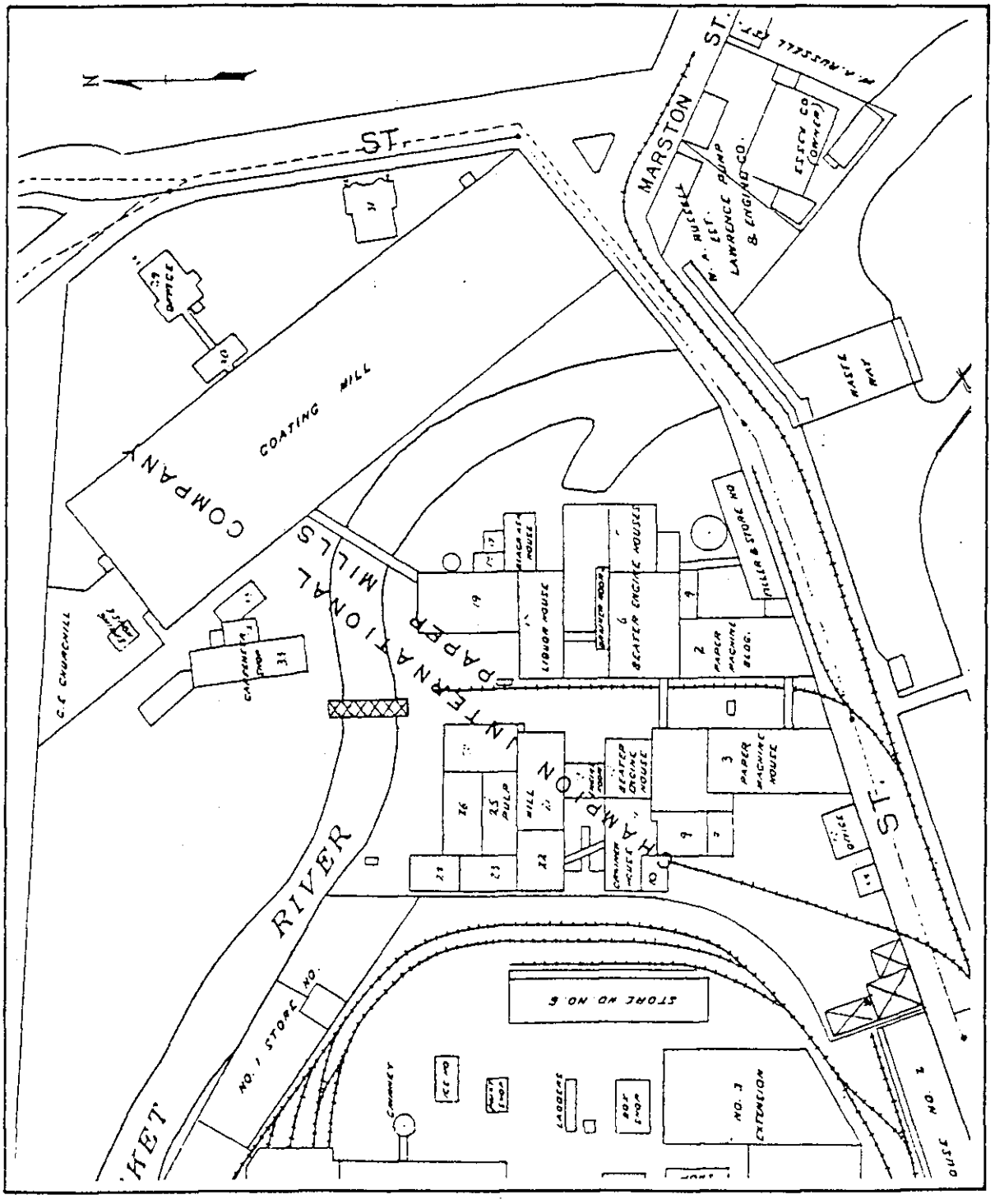

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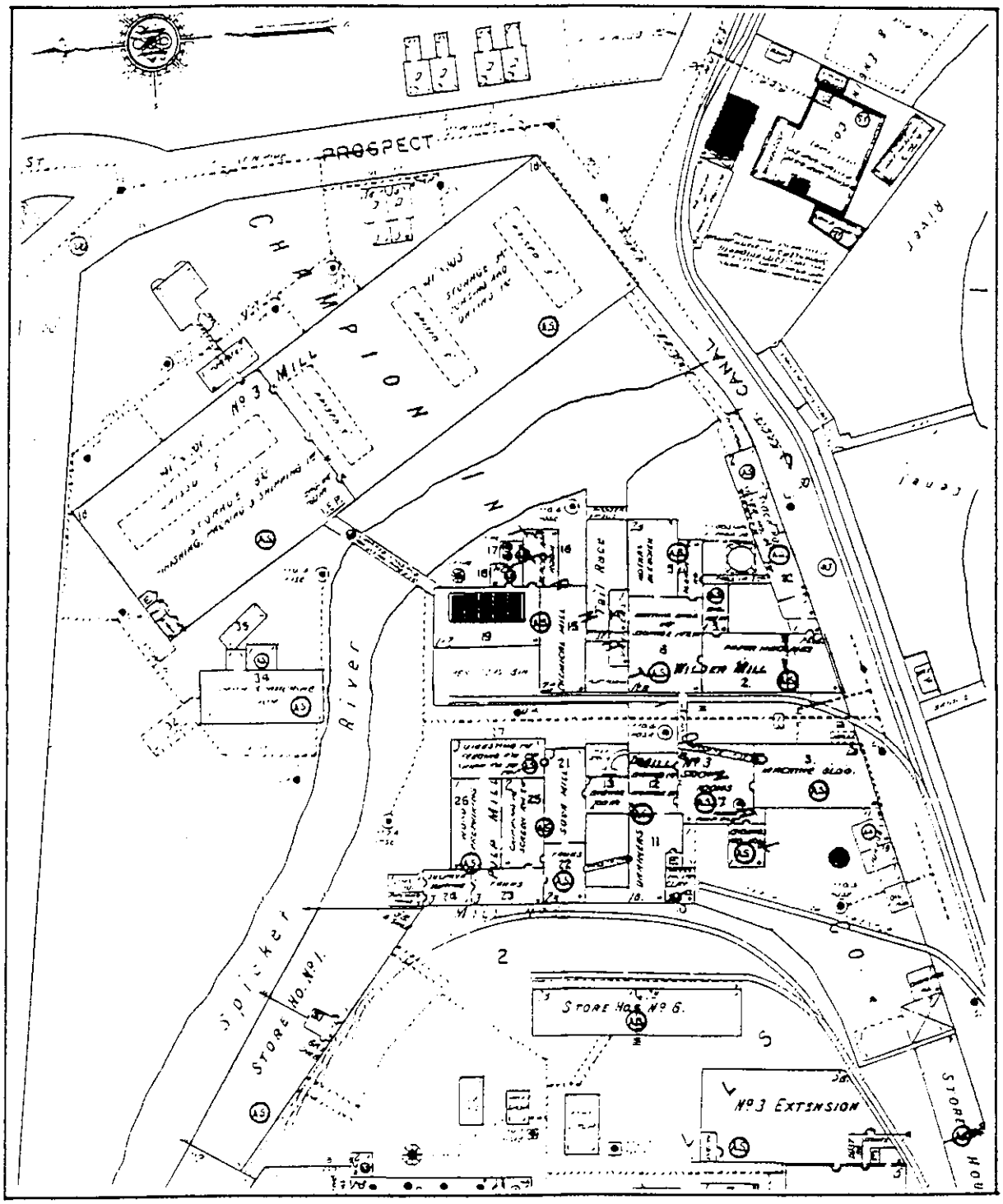

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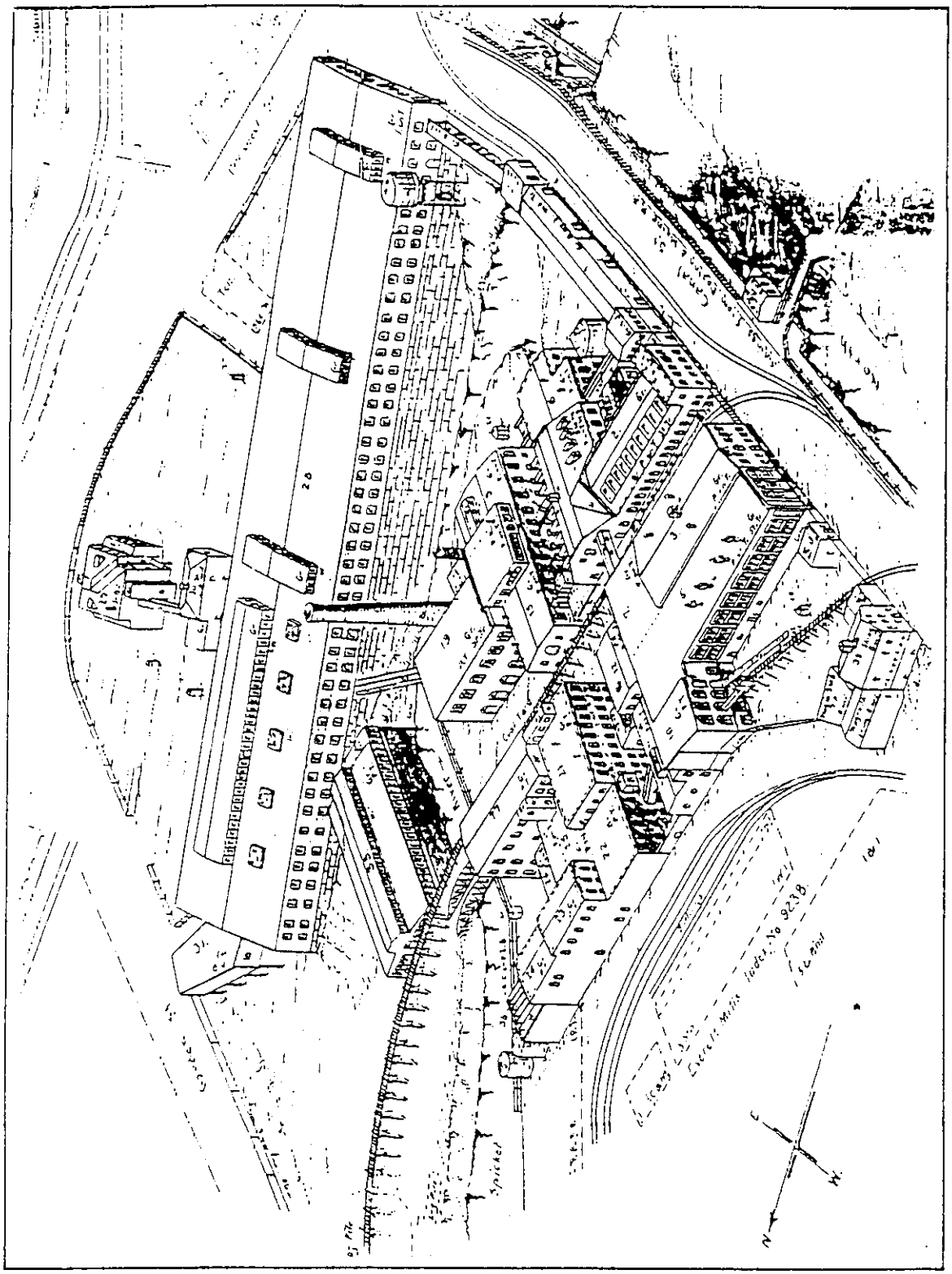

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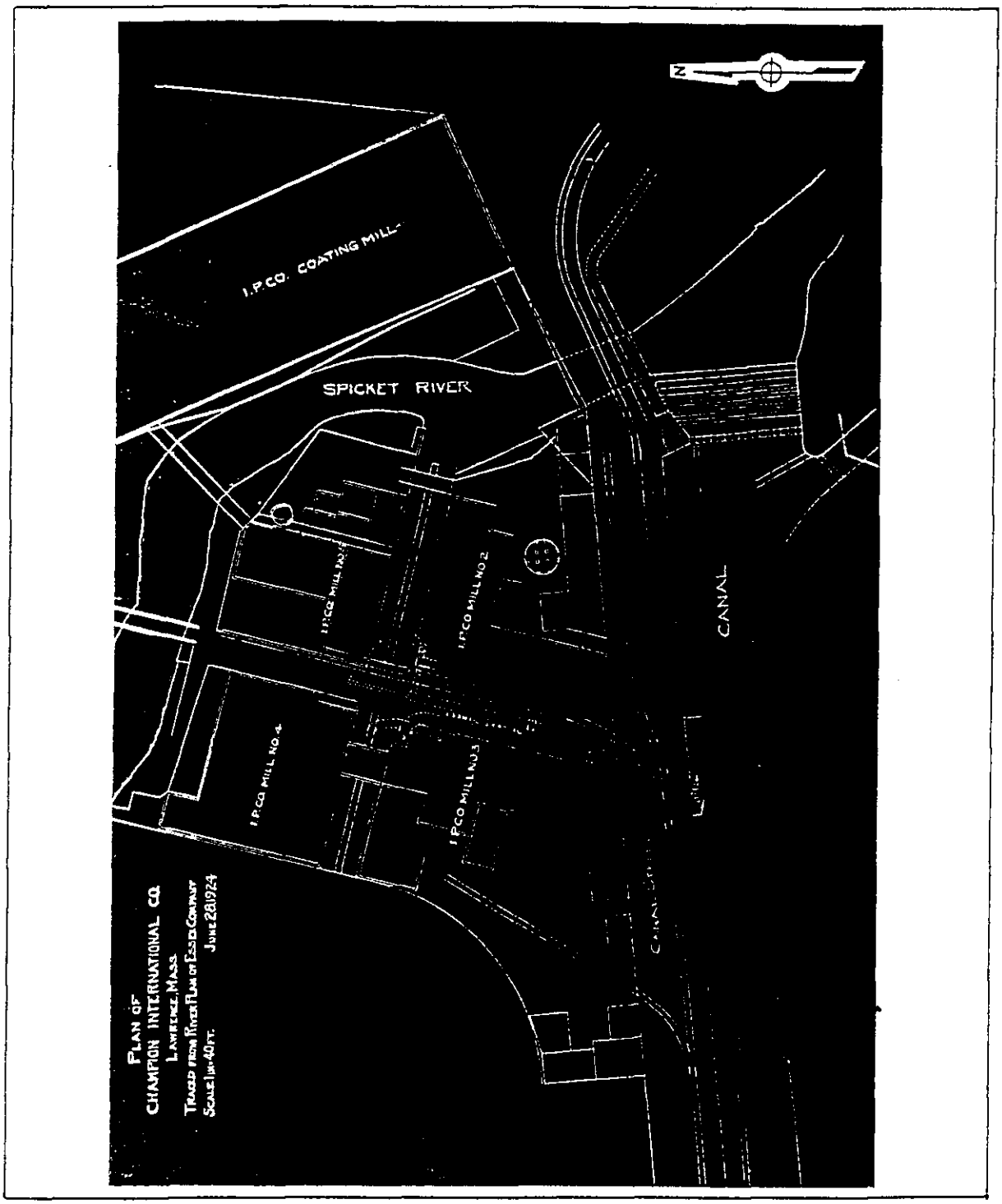

"Plan of Champion International Co., Lawrence, Mass., Traced from River Plan of Essex Company, June 28, 1924." [Collection of Immigrant City Archives, Lawrence, Massachusetts.]